December 1968 - January 1969

EMO

Emergency Measures Planning - 1968

Telecommunications Survival

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On Reorganizing After Nuclear Attack

CANADA EMERGENCY MEASURES ORGANIZATION

EMO
NATIONAL DIGEST

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In addition to publishing articles which reflect Canadian Government policy the Digest may also publish articles by private individuals on subjects of current interest to the emergency measures programme. The views of these contributors are not necessarily subscribed to by the Federal Government.

Editor: A. M. STIRTON

ROGER DUHAMEL, F.R.S.C. QUEEN'S PRINTER AND CONTROLLER OF STATIONERY OTTAWA, 1969

NATIONAL EMERGENCY MEASURES PLANNING - 1968

by

C. R. Patterson, Director General

Canada Emergency Measures Organization

The following is the text of an address delivered to the Annual Emergency Health Services and Emergency Welfare Services Director's Conferences at the Canadian Emergency Measures College in October, 1968.

It is interesting to take a look at the history of emergency measures planning in Canada and how civil defence has arrived at its present level. Emergency measures planning is not new. In the period immediately following the Second World War, Brigadier Ross, who was responsible for Air Raid Precautions, declared that civil defence is an integral part of Canada's total defence. He stated further, that without the co-operation of the provinces and municipalities and the acceptance of responsibility for civil defence at the local level, Canada's national defence was not complete. Today civil emergency planning is just that: an integral part of total defence including federal, provincial and municipal acceptance of responsiblilties.

The Chief of the General Staff, Canadian Army, and the Chairman of the Defence Research Board, as a result of almost continuous consultation during the period 1946 to 1948, in 1948 recommended to the Minister of National Defence that a position of Co-ordinator of Civil Defence be established in Canada. Major-General F. F. Worthington was appointed the first Co-ordinator in 1949. Following initial visits to Britain and to various provinces of Canada, he recommended the establishment of a Civil Defence directorate under DND. His proposal was accepted by government and responsibility for civil defence planning and activities was vested in that department until 1951 when it was transferred as a responsibility to the Department of National Health and Welfare in 1951.

General Worthington defined the purpose of civil defence as follows: "to minimize the effect of disaster on the civil population and to assist in the return to normal as soon as possible". There have been changes in the organization but the basic objectives remains.

During the early years of civil defence, a sequence of significant events occurred:

—1949—Russia exploded the atomic bomb.

—1952—The U.S.A. exploded the hydrogen bomb.

—1954—Information was released by the U.S.A. concerning the impact of radioactive fallout resulting from the explosion of a surface thermonuclear burst.

These events and other international happenings had significant effects on attitudes towards civil defence activities.

The Interdepartmental Working Group on War Measures, through the Committee on the War Book, made a study of civil defence and in 1957 recommended:

—the establishment of an emergency measures organization;

—the provision of suitable funds for civil emergency planning;

—the incorporation of the Civil Defence Organization within the Emergency Measures Organization;

—the preparation of suitable plans for the organization of emergency government including its headquarters and communications;

—the co-ordination of emergency plans of various departments and agencies;

—the initiation of tasks with provincial governments, including their responsibilities;

—the initiation of a public information program regarding emergency preparedness.

As a result of these recommendations, an organization known as the Emergency Measures Organization was set up in the Privy Council Office, separate from Civil Defence which operated in National Health and Welfare.

Lt.-Gen. H. D. Graham made a report in 1958 known as the "Graham Report" as a result of which EMO was further modified in 1959. It remained responsible to the Prime Minister through the Privy Council but now three additional federal ministers were given responsibilities for emergency measures—the Ministers of National Defence, National Health and Welfare, and Justice. The new organization absorbed the former Civil Defence Division of the Department of National Health and Welfare. Over the next five years it was realized that planning was being carried out most effectively by the departments assigned responsibilities for planning activities in peacetime. Accordingly,

in 1965 a new Order-in-Council (P.C. 1965-1041) was passed under which nineteen federal departments or agencies were now charged with responsibility for peacetime planning for a national emergency. Canada EMO, under the Minister of Defence Production, was made basically responsible for co-ordination of the plans and preparations of government departments to the end purpose of providing total preparedness to cope with disaster. Canada EMO was also made responsible for the provision of those services which are not available through regular government departments, or where more than one department is involved.

One activity which is of particular interest to all of us is that of continuity of government. It involves facilities and communications, manning, and the necessary plans, agreements and organization for emergency government in time of war.

I was appointed Director General in 1965. At that time the hon. C. M. Drury, the minister responsible for Canada EMO told me, and I paraphrase, "We have developed emergency arrangements with the Federal-Provincial ministers regarding emergency measures across Canada. Our responsibility is to plan, to man the plans with specialists who can carry out these plans, to exercise these specialists, and to provide the necessary facilities where facilities are not readily available." He stressed that emergency measures must be developed as a part of regular government planning.

I was away in Quebec for a period of 10 months and came back in 1957 about the time that the government was taking firm economic measures with respect to departmental spending. The minister asked Canada EMO to develop recommendations for continued emergency measures activity in Canada on a very economical spending budget. As a result of government consideration of our Minister's recommendations, it was agreed that all aspects of emergency measures activities would continue but the goal previously set for 1970-72 completion of approved measures would be extended to 1975. To reduce immediate costs, capital construction and equipment acquisition was deferred till a later date. Expenditures were designated for minimum planning staffs, the training of key officials and necessary technical people, and for the maintenance of existing major systems which had been developed as essential to the preparedness program.

It was further proposed to Canada EMO that a study in depth should be made of the whole of civil emergency measures planning in Canada and, accordingly, a study, "Project Phoenix" was initiated. "Phoenix" had as its purpose: investigation of the objectives of civil emergency planning; studies with other federal government departments and with provincial authorities to determine individual activities; the desirable grouping of activities within the total emergency program; the determination of measurable goals; the establishment of planning priorities, and revised effective management of the Canadian program of civil readiness preparations.

Our Minister has agreed that the "Phoenix" report and recommendations should go out to the provinces and associated federal departments for study. When conclusions are reached by officials the findings will be submitted to the responsible ministers with the purpose of holding, early in 1969, a federal-provincial conference to reach an up-dated set of agreements for emergency planning in Canada.

I would like to add a word about our new relationship in government. As you are aware, in the government reorganization which was announced in July, 1968 the Canada Emergency Measures Organization became a branch of the Deputy Minister's Office, Department of National Defence.

This new relationship under a Minister who is cognizant of, interested in and in support of our program allows us to be identified with the total defence community. We have been given a very fine welcome into the department by the Deputy Minister, the Canadian Forces and the Defence Research Board.

I hope you will all involve yourselves deeply in the continuing studies with respect to "Phoenix" and which will come about as a result of it because your participation in the design of effective guidelines and the incorporation of them into emergency measures activities in Canada will be needed.

I appreciate the opportunity of talking to this group because yours is a group which shows a continual, effective interest in the implications of emergency measures in Canada and what can be done by individuals. I say, as I have said before, Canada EMO can only do so much—it can co-ordinate, it can combine the thoughts of all the associated agencies into guidelines, it can stimulate the supply of facilities, communications, organization, manning and exercises for emergency plans but, in the end, if we ever come up against the real thing, you and those like you in the provinces and municipalities are the people who will be carrying a very heavy responsibility.▲

SURVIVABILITY OF THE CANADIAN TELECOMMUNICATIONS NETWORK

A presentation of this material was made at a NATO conference on "The Survivability of Communication Networks", Ile de Bendor, France, June 17-21, 1968, by G. E. Inns, Chief Engineer, Toll Area, Bell Canada, and Chairman of the Engineering Committee, Trans-Canada Telephone System. The text of this presentation is being published by NATO in the conference proceedings.

SECTION I

Introduction

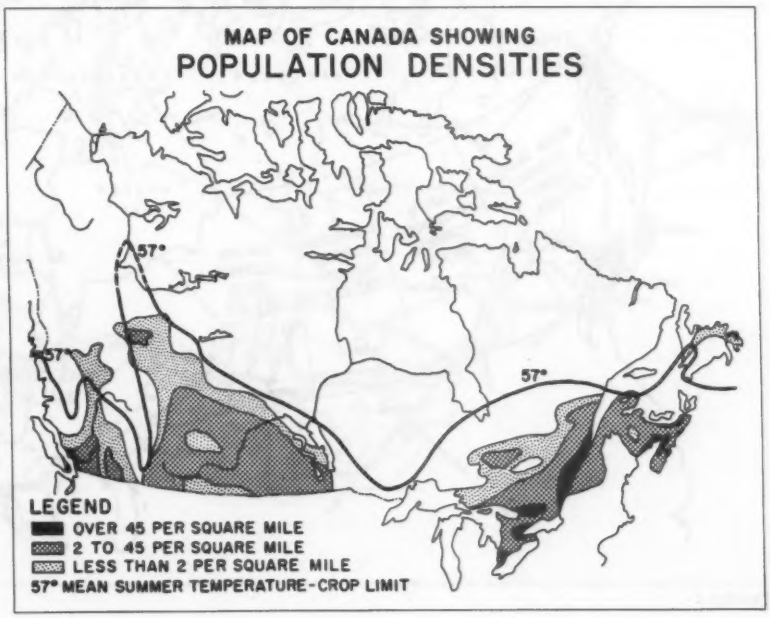
This presentation discusses the telecommunications network of the Trans-Canada Telephone System, with particular reference to the planning and operating techniques and skills used to ensure its survivability under all conditions of emergency.

The first long distance telephone call in the world was made in Canada in 1876, between Brantford and Paris, Ontario, a distance of 26 miles. Since that time, use of telephone service in Canada has grown to the point where about 8 million telephones now serve Canada's 20 million people, and Canada ranks 6th among the world's nations in the number of telephones in service. In telephone usage, Canadians rank 1st with 644 calls per person yearly. This may seem remarkable when you consider that Canada's relatively small population is distributed over a vast geographical area of 3.6 million square miles. In actual fact, however, the population is distributed in a narrow band approximately 100 miles wide over a 4,000 mile distance from coast to coast.

EXHIBIT 1 *shows population densities. The heavy line is the northern temperature limit beyond which regular crops are not grown. This type of population distribution has compounded the difficulty of building a survival network in Canada.*

The telecommunications industry in Canada is unique in that it consists of more than 2,000 separate but interconnected systems, employing in all some 70,000 people. The eight major regional systems are closely associated in the Trans-Canada Telephone System, which is responsible for the provision of service on a national scale. Trans-Canada ensure that Canadian subscribers have compatible, reliable service from coast to coast in Canada, and with the United States, as well as with the rest of the world.

Since its earliest days, the Trans-Canada system has recognized the need to provide continuity of service and therefore the survivability of the facilities which provide it. From the very beginning, our facilities have been tested by floods, lightning, sleet storms, snow storms, forest fires, explosions and other disasters. Through the years, more and more effective techniques have been developed —and are continuing to be developed—to assure continuous service under various types of emergency situations including war time conditions. Our policy is that the industry has a responsibility to the public, to essential users and to the Government for continuity of service under all conditions. Costly as it is, there have been numerous cases where this policy has been more than justified. A good example was the extensive power blackout which occurred in 1965 in the Northeastern U.S. and extended into Canada, affecting a total of 30



million people. Because of the policy of providing emergency power plants at all key locations on the telephone network and thanks to our network management arrangements, it was possible to maintain communications throughout the period of the blackout. Not only did this minimize public hardship and panic but the work of power restoration was speeded immeasurably by uninterrupted telephone service. This dependability of service was the result of good planning. Emergency procedures had been developed and established, equipment was available and trained, competent personnel knew what had to be done.

The balance of this presentation expands on the historical and current background of our communication network, with particular reference to planning and the operating techniques used to develop and maintain a high degree of survivability.

SECTION II

The Integrated Network

The communication network in Canada is a very large and complex system serving almost 8,000,000 telephones through the facilities of more than 2,000 separate telephone companies. These companies vary in size from small rural co-operatives serving a few customers to large, publicly or privately owned systems. Under governmental regulation of one form or another, they work together to provide good quality service at reasonable cost within the territories they serve, and to provide means of connection with telephone throughout North America and overseas. It was not always this way. In the early years of the telephone industry, companies were developed to serve local territories with little regard to long distance transmission. With

EXHIBIT 2

the unique geographical distribution of the people in Canada, this method sufficed for many years. However, with the impetus of the first world war and the emergence of Canada as a national entity, progress was rapid and it became evident that some form of co-operation and coordination between telephone companies was required if all Canadians were to have adequate reliable service. A number of organizations evolved to provide this; one of the best known is the Trans-Canada Telephone System.

EXHIBIT 2 *shows the operating territories and the approximate number of telephones served by the various member companies of the Trans-Canada Telephone System.*

The Trans-Canada Telephone System was created to develop and ensure a high quality system, engineered and operated as a fully integrated telephone network reaching from coast to coast in Canada. It is a voluntary association of eight major regional telephone systems who have agreed to coordinate and interconnect their respective telephone facilities for the interchange of telephone business.

Interconnection with the Trans-Canada Telephone System network is available to every other telephone company in Canada through the facilities of one of the member companies. The system design and coordination are in the hands of functional committees which perform and administer the day-to-day traffic, plant, marketing and engineering duties.

EXHIBIT 3 *shows the major Canadian microwave routes crossing Canada. These, and their various branches, are operated by the Trans-Canada Telephone System member companies and by the telecommunications departments of Canada's two major railways. In addition, several large tropo-scatter radio systems work into the northern regions of Canada and are used for both defence communications and general telecommunications services. The railways operate a system through the Northwest Territories to Lady Franklin Island where there is a connection to Greenland. The telephone companies operate a system to Alaska up the west coast of British Columbia, and another through Quebec and Labrador to Goose Bay. This latter system joins up with a tropo-scatter system which*

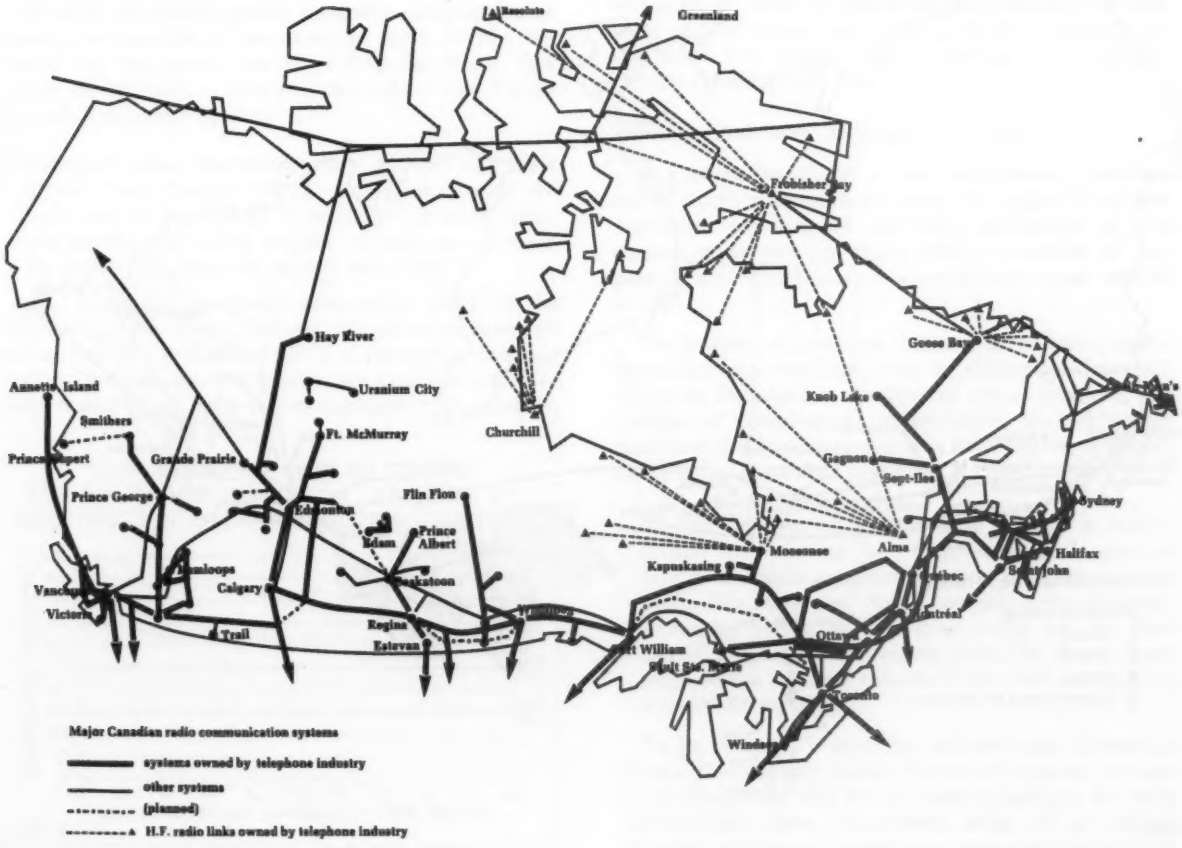


EXHIBIT 3

is routed along the eastern seaboard of Canada and interconnects to the ICE-CAN cable which connects to Thule, Greenland.

Main routes are designed to carry not only the basic telephone and defence communications services but also an ever-increasing traffic in special services such as TV, radio and data. Because of the multiplicity of routes across Canada, it is virtually impossible for any disaster — military or otherwise — to destroy the entire network. The circuits in individual trunk groups are always diversified by sharing them on all available routes. By-passes of likely target areas are provided throughout the country.

EXHIBIT 4 *shows the homing arrangements for the 200 tool centres in the Canadian Dialing Network. There are approximately 2,000 local offices (not shown) which home on the various toll centres. These offices are linked by more than 4 million miles of long distance communication circuits. Approximately 1,250,000 long distance calls are completed over this network daily.*

Canadian rely very heavily on their telephones. In the beginning this was primarily to overcome difficulties in communication imposed by climatic and geographic conditions. Today, it has become natural to use the telephone freely in all business and social activities.

Among the major factors ensuring reliable service are the size and dispersal of the network. Extensive diversification is provided in the switching hierarchy of the direct distance dialing network. Connections between any two localities are provided through switching machines which select and interconnect several communication links from a number of predetermined paths spread over various routes and structures. Direct high-usage trunks link offices between which there is a large volume of traffic. These are the first choice paths for most long distance calls. If first choice paths are unavailable because of overload or blockage conditions, other paths are selected automatically. Whatever path for a long distance call is determined by the switching machine, it must be of excellent transmission quality regardless of routing. All Trans-Canada routes, therefore, must be designed to very exacting standards in order that the quality of transmission will not be degraded regardless of the number of paths that may be linked together and the different routes followed.

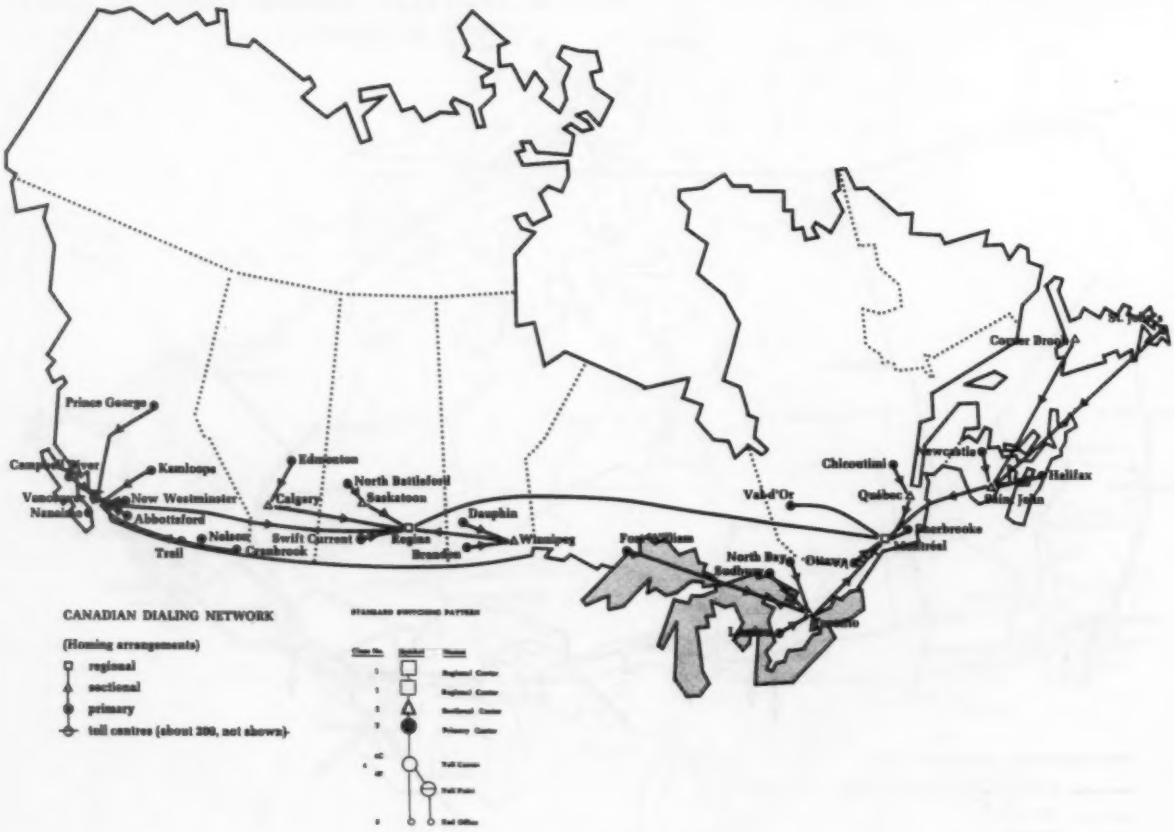


EXHIBIT 4

Practically all telephone traffic between Canadian points is routed within Canada. There is a limited exchange of facilities along the border with our American neighbours for additional diversification of routing on intra-country traffic.

So far, the built-in diversification inherent in our switching and facility network has been covered in broad terms. There are, of course, many other factors contributing to survivability and speedy restoration, which have been evolved through the years. Not the least of these is the development of a widely-dispersed organization of some 70,000 skilled employees spread throughout the country, backed up by a large fleet of motor vehicles, and depots of stand-by equipment and materials that would be needed for rapid restoration of service.

SECTION III

Planning for Survivability

Let's review some of the specific approaches used in Canada in planning the job. These include the concepts of route diversity, metropolitan area junction planning, terminal area protection schemes including so-called Thread of Life and Line Load Control, defence planning and the provision of spare standby equipment.

Route Diversity

In order to guard against complete interruption of service, we consider it necessary to carry circuits between any two points over more than one route. This policy of diversity is followed throughout the Trans-Canada Telephone System.

EXHIBIT 5 *shows the percent route diversity objectives of the Trans-Canada Telephone System as they are today and as they will be in the future. In many cases, and particularly where defence circuits are involved, the future objectives are already being met.*

The minimum acceptable restoration today, in the event of a route failure, includes all special services and defence circuits plus at least 30% of the regular message traffic. Detailed restoration plans are available and have been tested for all main routes throughout the country.

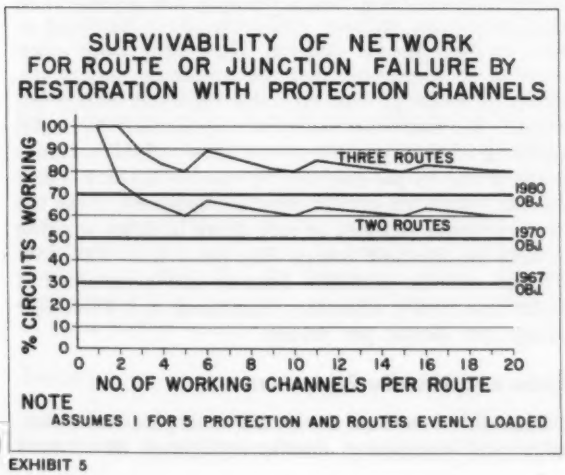


EXHIBIT 5

The circuits in each traffic and special service group are planned so that they are divided between the available routes as evenly as practicable. If loading on each of two routes is kept reasonably close, then the survivability in any cross section on failure of one route will be at least 50% and will be increased substantially by using the protection channel on the other route.

Three equally-loaded routes will automatically ensure that no more that 33% of the facilities will be out of service in the cross section at moment of failure of one route and, of course, use of the protection channels on the other two routes would increase the available circuits substantially.

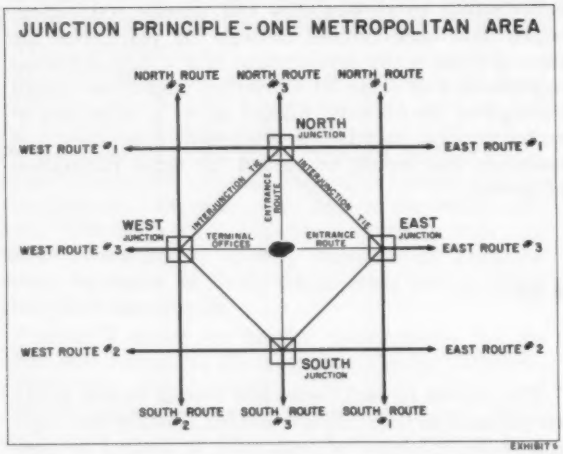
Metropolitan Area Junction Planning

In Canada two-thirds of our population is concentrated in 15 metropolitan areas. In order to obtain maximum survivability and take advantage of the diverse routes serving these areas, a method of bypassing and diversification around these large centres is used.

The number of junctions that may be required near a particular metropolitan area is influenced by such things as the number of different routes required, the number of directions of transmission, the amount of backhaul that can be accepted and the degree of dependence to be given to a particular junction.

EXHIBIT 6 *shows an ideal junction plan for a Metropolitan Area having four junctions—one located at each of the major compass directions from the terminal office. The North and South junctions serve primarily as routing points for East-West traffic and the East and West junctions are routing points for North-South traffic. Each junction requires a terminal link joining it to the terminal office.*

To be effective, a minimum of two—and ultimately three— fairly evenly loaded routes are required in each of the East-West and North-South directions for each Metropolitan Area. Maximum usage of protection channels for restoration purposes requires that the four junctions be linked with interjunction tie structures.



In our planning we try to keep the junctions 35 miles apart so a nuclear blast or other major disaster affecting the terminal office and one junction point would not affect the others. This Metropolitan Area Junction Planning is in effect throughout the Trans-Canada network and a fundamental plan extending to the year 1990 ensures that it will not be violated.

Thread of Life

In order to provide the civilian population in our major centres with some means of communication with the outside world in the event of a disaster, we are proceeding with "Terminal Area Protection" which includes Thread of Life plans and Line Load Control. These plans are designed to meet only the most basic communication needs of a densely populated area in severe isolation and emergency conditions, where normal routing and switching facilities are incapacitated.

Today, toll access circuits are normally directed towards the sensitive core area of a community. Thread of Life circuits must, of necessity, radiate towards adjacent toll centres. They provide minimum facilities to connect the disaster area with the outside world.

Briefly, the plan is as follows: in each sensitive area, exchange central offices are identified; these are in the outer fringe of the city and on a cable route to an adjacent centre. They are called "Thread of Life access offices".

Under the plan small groups of circuits (usually 12) are established from the Thread of Life office to a distant toll centre where they terminate at the switchboard. Only persons with an established need to use these circuits in times of disaster know the numbers. Operation from the disaster area is "automatic"; operations from the remote switchboard is manual.

The facilities are "hot" at all times and under continuous routine test. The toll centre operator reached by way of the Thread of Life access office has the ability to reach other required points without passing through the affected toll switching machine.

Line Load Control

An office or network can be paralyzed by too many people trying to use it at one time. In order to prevent this and ensure that service is available to key people, a procedure called Line Load Control is used. Without affecting incoming traffic, it limits the number of local telephones which can originate calls in times of emergency or heavy load conditions.

Line Load Control ensures the continuity of telephone services for key members of the civilian population such as government agencies, doctors, hospitals, and police. This usually represents about 10% of the line terminals in a central office. Inward service for all customers and two-way service for coin stations are not affected.

A basic requirement of Line Load Control is the concentration of essential service lines within selected groups or section of each originating equipment unit. This arrangement permits the ready denial of outward service to all remaining lines when an overload might jeopardize essential services.

Defence Planning

The planning and provision of military circuits is a continuous activity of the Trans-Canada Telephone System. Major undertakings have included warning systems which extend across Canada. Work is also well advanced on the conversion of a point-to-point system to a nation-wide, fully automatic switched system. Facilities for these warning systems have been provided along with interconnections to tie them in with the integrated continental air defence system.

Select Circuits

The term Select Circuits refers to a group of approximately 600 essential Command and Control Circuits which the military authorities have identified as vital to the national defence. Their continuous operation is so important that the minimum service objective is 99.99%, with no more than one outage per month. We meet this stringent requirement by initial planning of these circuits on the most reliable facilities possible and by pre-engineering standby layouts. These layouts, which are implemented immediately, make use of either spare facilities or turn-down of other working circuits on alternate routes. The more than 900 other defence circuits presently existing are maintained at better than 99.9% reliability, equivalent to a 45 minute outage per cicruit per month.

Spare and Standby Equipment

In addition to these design and emergency measures, spare and emergency mobile equipment of various

types are available throughout Canada. Failure of power cannot be tolerated under any conditions if continuity of service is to be guaranteed. In all switching centres, batteries are capable of operating the equipment at peak load until emergency power supplies are established following interruption of commercial power supplies. All microwave repeater stations and long distance switching offices have reserve battery supplies and diesel power generating equipment permanently installed. Fuel and lubricating oil sufficient for several days of continuous operations is stored at microwave stations, and portable generating units are strategically located throughout Canada for use in smaller buildings as required.

Complete mobile switching centres equipped to serve from 400 to 800 lines on either a manual or dial basis are ready to be moved on a moment's notice to temporarily replace a damaged office in any area.

Portable microwave towers are also distributed across Canada. In most cases, one of these towers can transported to the site of a damaged tower and set up within a day. Complete portable radio-relay station trailers equipped with power are available to replace damaged microwave stations. Many of our vehicles, equipped with mobile telephones, can and do function in non-communications capacities in emergencies, including rescue operations and the provision of power to hospitals and other essential services.

For shorter haul cable carrier services, portable powered repeater huts are available, as are pole-mounted cabinets equipped for 114 circuits. In addition, an extensive emergency stock, including infrequently-used parts, is maintained for use throughout the territory, and manufacturers with warehouses throughout Canada also maintain stocks of parts.

SECTION IV

Operating and Controlling the Network to Maintain Survivability

As mentioned earlier, the basic objective of the Trans-Canada Telephone System is to provide adequate facilities which have the greatest possible reliability and the best possible transmission characteristics. This necessitates very high standards and strong control measures.

Organization

The Trans-Canada companies operate in a military manner, with authority delegated to various levels of management people who are dispersed throughout the country and held responsible for service within their respective districts. Under overload or emergency conditions, control centres operated by the traffic and plant people swing into action. In case of widespread or national emergency, teams of management personnel move to special centres to direct operations.

Employees are being continually updated in the latest concepts of survivability and techniques of restoration. Many of them are highly trained in safety, first-aid, rescue operations and fire fighting. Because of the common approach throughout the System, it is possible for employees of any member company to be moved anywhere in Canada to handle any emergency situation. Incidentally, the telephone system operates the largest fleet of cars and trucks in Canada, consisting of some 10,000 vehicles.

Security

All Trans-Canada Telephone System employees are issued with identification cards including photographs. This identification aids freedom of movement and ensures that no unauthorized persons have access to equipment locations or records.

Fallout

Telephone buildings throughout Canada have been surveyed to identify those which would offer suitable shelter space for protection of employees against radioactive fallout. Key locations for the maintenance, control and restoration of facilities have been identified. Measures have been taken to improve the fallout protection afforded by these key buildings, even to the extent of relocating equipment where necessary.

Preventive Maintenance

Probably the most important factor in insuring survivability of the communication network is our extensive and continuous preventive maintenance program.

All equipment and facilities are checked, tested and given routine maintenance at regular intervals. Standard procedures and methods have been adopted throughout Canada. Alarm systems are extensively used to indicate failures or possible failures, for instance when a fuse fails or an engine runs hot.

Major switching toll centres and main microwave terminals are staffed by management people and technicians 24 hours a day, seven days a week. Smaller centres are manned eight to twelve hours a day, five to seven days a week depending on local requirements. Repair and maintenance test centres have been established at many key locations. As part of the day-to-day job, continuous testing is performed on the overall network to ensure its correct functioning and reliab-

ility. In all cases, trained personnel are available and on call at all hours.

Plant Status Centre

The plant operating personnel of the Trans-Canada System member companies have established status centres at various key locations across the country. These centres are monitoring the network continuously to keep senior management informed of any threatening condition which might cause system failure, select defence circuit failure, TV and radio program failure, or other serious service interruption. Supplementing the status centres throughout the country are local damage assessment centres which are activated under any emergency conditions, including those resulting from storms or other natural causes.

Traffic Network Management

There are times when emergency or overload conditions create demands for service which cannot be handled by the existing engineered circuit layout pattern. At key locations the traffic people have established network control centres equipped with such visual and mechanical aids as display boards and traffic registers to readily identify problem situations. These centres are in constant contact with all control switching points in Canada and can quickly make temporary changes in routing patterns.

The traffic network administration people work very closely with the plant people in the restoral of service.

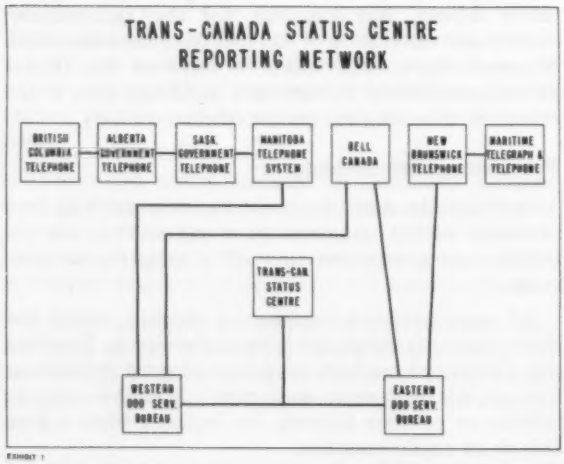


EXHIBIT 7 *shows the Trans-Canada Status Centre Reporting Network.*

The status centres have display boards on which all troubles are posted as they are received, together with the cause of the service interruption, the location of the difficulty and the restoration action being taken. Reports are regularly submitted to senior management summarizing all operations. In addition to this monitoring service which is essential to the continuous operation of a long distance network, the status centres develop restoration plans for major toll facilities, analyze data to effect service improvement for day-to-day operations, and coordinate exercises to test emergency restoral plans, procedures and people.

Emergency Control Centres—Alternate Headquarters

In addition to the plant status and traffic network control centres, there are other emergency control centres which swing into action depending on the magnitude of the emergency. The most interesting of these centres is the alternate headquarters whose purpose is to guarantee the survival of at least the essential communications in the event of a major disaster such as nuclear bombing attack.

The alternate headquarters are located at various points across Canada, remote from likely target areas. They are completely self-sustaining and built underground for maximum protection against radio-active fallout. They have their own power, food, water supplies and sleeping quarters to accommodate the necessary staff for a period of at least two weeks.

Each such centre has complete records including detailed routing and restoral plans together with copies of all documents necessary for the continued operation of the company to which it belongs. They have display boards, monitoring devices and communications to emergency centres and to Government officials.

In a national emergency, teams of predesignated management people would move to these centres to direct the operation, maintenance and restoral of service.

Exercises simulating various disaster conditions are performed at regular intervals and their results are carefully analyzed to evaluate and strengthen the effectiveness of our survivability techniques.

SECTION V

Summary

The Trans-Canada Telephone System's objective is to provide reliable, high quality, continous service under all conditions. Survivability of communications is a prime consideration in planning, operating and controlling the general telecommunications network and is an essential factor in determining its adequacy for military and civil defence purposes, or for use in

(Continued on page 17) **SURVIVABILITY**

CIVIL DEFENCE IN AUSTRALIA

This report on civil defence planning and activities was provided by Mr. R. Bale, Director, Directorate of Civil Defence, Department of the Interior, Canberra, Australia.

Background

Civil Defence in Australia developed out of the experience gained in the 1939-1945 War, and in 1949 the nucleus of a Commonwealth Civil Defence organisation was formed.

Autralia operates under a federal system of government, the States having sovereign rights with certain general functions vested in the central governement. Negotiations between the Commonwealth and State Governments resulted in a basic civil defence policy being agreed upon and a central Civil Defence Training School being established by the Commonwealth in 1956 at Mt. Macedon in the State of Victoria. The purpose of this school was to ensure a common basis on which the States could develop their civil defence organisations.

Policy

Discussions were held between Commonwealth and State Ministers, and in 1959 the Commonwealth Minister for the Interior outlined the proposals for a civil defence programme as under:

I. A nuclear threat to Australia would arise only in the event of global war which is inlikely as a deliberate act of policy. But even in that event it is unlikely that Australia would be a primary target for nuclear attack although the possibility of an attack in some form could not be ruled out entirely.

II. Despite the destructive power of modern weapons it is possible to set up a civil defence organisation which can make an effective contribution to survival and rehabilitation following conventional or nuclear attack.

III. The civil defence programme should be consistent with the overall defence policy and programme and related at any time to the assessment of the strategic situation. In these circumstances substantial diversion of our national resources from the active defence programme to the civil defence programme is not warranted at the present time.

IV. An active civil defence programme is necessary to ensure the orderly development of plans and preparations for a national civil defence plan.

V. It is a basic principle that the States are responsible for the development of their own civil defence planning and programmes.

VI. It is the function of the Commonwealth to —

- provide information on the strategic situation
- initiate plans for civil defence as required in Commonwealth Territories
- give national guidance
- undertake a programme of public education on weapons effects
- coordinate as necessary the plans of the States into an effective national civil defence plan
- provide a limited range of specialised equipment for training purposes.

Under our federal system state governments exercise control over most of those functions which are essential to survival in major catastrophies, for example, maintenance of law and order, medical and hospital services, fire fighting, transport, provision of public utilities including water, gas, electricity, and so on. Control over these functions is the very essence of an adequate civil defence programme.

Aerial photograph of the Australian Civil Defence School and grounds at Mt. Macedon, Victoria, showing the school building in the foreground with the damaged building training area and rescue tower behind the school.

The role of the Commonwealth Civil Defence Directorate was outlined to be —

- make available to the States, as necessary, information on the effects of nuclear weapons
- initiate planning for civil defence as required in Commonwealth Departments and Territories
- give national guidance
- provide liaison with and coordinate as necessary the plans of the States
- to a limited degree, programme the stockpiling of items of essential equipment which are likely to be in short supply in emergency.

Development

Each year since 1960 the Commonwealth Government has endorsed a civil defence programme to be carried out by the Commonwealth Civil Defence Directorate to implement the proposals accepted for the achievement of the object of making steady progress with a National Civil Defence Plan. These proposals have included —

(1) the continuity of supply of training equipment to the States and Territories to an average value of $300,000 per year

(2) provision of a siren warning system in certain areas

(3) erection of emergency broadcasting stations to provide radio broadcast communications in areas where it is considered the existing stations would be vulnerable to attack

(4) printing and distribution to the State organisations of publications for the education of the public and training manuals for the voluntary Civil Defence organisations

(5) carrying out a fallout shelter survey in existing buildings in all major cities

(6) spreading the knowledge of the protective techniques necessary to provide improved fallout

shelter space in all new buildings; this is being carried out with the cooperation of the universities and other appropriate training organisations

(7) maintaining the central Civil Defence School a-Mt. Macedon in Victoria which is run contit nually to provide instruction for students from all states and territories (New Zealand has also sent students to this school.)

(8) coordinating the states' civil defence plans and arranging meetings of the state directors to determine policy matters and ensure a uniform civil defence policy is adopted throughout Australia and that steady progress is made with the overall planning

(9) advise in the planning by the Postmaster — General's Department for communications, and the Department of Health with medical plans.

The activities in the various states and territories are covered in the following paragraphs.

NEW SOUTH WALES

The State of New South Wales occupies an area of 309,433 sq. miles, being about one-tenth the size of Canada, and has a population of approximately 4,300,000.

The Government recognised the need for a Civil Defence Organisation and in 1955 appointed a State Director of Civil Defence and a small full-time staff.

The director was required to undertake active planning to deal with possible emergencies likely to arise from enemy attack. Preparations were to proceed on the basis of an attack by nuclear weapons of maximum power. They were to be advanced to the stage at which, should the need arise to recruit large-scale civil defence forces, a nucleus would be available to train and equip them and provide operational control. Planning was to proceed on the assumption of three possible target zones — the cities of Sydney, Newcastle and Wollongong — with the remainder of the State to provide areas from which support could be drawn and to which evacuees, refugees and casualties could be evacuated.

Organization

For operational purposes, the local government areas of New South Wales were selected as the basic geographic areas.

Each city, shire and municipal council throughout the state was asked to appoint a Controller and establish a local Civil Defence Organisation in accordance with a pattern laid down by the Director. As at September 1968, 218 of the 225 local government areas had responded. The controllers are volunteers, as are also the members of their organisations. There is a chain of control or command which groups the cities, shires, and municipalities into three zones, seventeen regions with sub-regions where necessary. The zones are the assumed target areas of Sydney, Newcastle and Wollongong, while the remainder of the State contains the regions. The regions are grouped into six civil defence areas. In the Sydney zone only there are groups.

The Director of Civil Defence has the status of a permanent head of a states government department with a permanent staff of forty officers. The staff are also permanent officers of the public service of the state. The voluntary element is large and consists of the personnel spread throughout the State.

The director is pursuing a policy of establishing a strong decentralised organisation. Six full-time staff officers, six full-time shorthand-writers and typists and seven part-time office assistants have been appointed to assist zone, regional, etc., controllers. Headquarters accommodation has been provided for seventeen controllers.

Civil Defence training is aimed at building up the zone and regional Headquarters by the provision of training equipment and the conduct of courses for volunteers within their areas. Volunteer training teams have been established at State headquarters and on request visit the zones and regions to conduct weekend courses and demonstrations for the medical and health, scientific, and signals services. These courses produce qualified personnel to pass on knowledge to members of the local organisations.

Members of the organisation may attend training courses at the Australian Civil Defence School, established by the Commonwealth Governement at Macedon, in the adjoining State of Victoria. These courses produce qualified personnel and instructors. With the assistance of these instructors, specialised training in rescue, scientific, welfare, signals and warden services is provided for the volunteer personnel in the organisations throughout New South Wales. As at 30 June 1968, 2962 students from New South Wales had attended the school.

Two of the basic principles upon which the New South Wales civil defence plan is founded are (a) the utilisation of existing facilities as far as possible, and (b) departments and utilities retaining in time of war their normal peacetime functions. It is not the aim of the New South Wales Civil Defence Organisation to build up a large central body. Coordination is the keynote. The application of the two principles mentioned results in close liaison being maintained with the police, state and commonwealth departments, public utilities and semi-government bodies, the armed services and other organisations such as the Australian Red Cross, St. John Ambulance Association, Salvation Army, churches and the like. Coordination of activities is carried out at all levels of the organisation, from the state headquarters down to the local headquarters.

In February 1956 the organisation became responsible for the coordination of activities in times of flood to ensure that essential services operated smoothly, the making of plans for flood warnings, communications, evacuation and welfare, rescue, provision of essential services, medical care and the provision of immediate forms of relief including fodder for starving stock and restoration of essential services after flooding.

Operations

In New South Wales practical operations to date have been confined to floods, of which many of a serious nature have occurred. Although the organisation is also responsible for the welfare (feeding, temporary housing, etc.) of bush fire victims, to date necessity for action in this field has not arisen. The organisation is not, however, concerned with actual bush fire fighting operations.

A Flood Boat Advisory Committee has designed flood rescue boats and modified commercially produced boats. Local government authorities throughout the state are encouraged to purchase boats of approved design and in this they are subsidized by the government on a dollar for dollar basis.

A reserve fleet of eight flood rescue boats is located in Sydney. Manned by police crews, the boats are available for use whenever and wherever required throughout the state. Water police also assist the Civil Defence Organisation by conducting training courses for volunteer crews of flood rescue boats throughout the state.

Flood emergencies have effectively tested the organisation on many occasions. Operations have required the use of flood rescue boats, Army DUKWs and Royal Australian Air Force aircraft, including helicopters. During major floods, the state and various zone, regional and local headquarters concerned are manned on a twenty-four hour basis until the emergency passes.

During the year 1967/68 flooding occurred on twenty-five river systems throughou the state.

Civil defence organisations also rendered assistance to the police when severe damage resulted from tornados striking three towns; when heavy seas threatened houses in a beach-side suburb, and when an explosion occurred in a suburban chemical factory.

Finance

During the last few years the average overall expenditure on civil defence in New South Wales has been in the vicinity of A$245,000. For the year ended 30 June, 1968, direct expenditure from consolidated revenue amounted to A$308,237, while a further A$77,308 was met from the funds of other state government departments on behalf of the Civil Defence Organisation.

The New South Wales Civil Defence Organisation has made steady, but continuous progress since its inception in 1955. During that time its activities in the field of flood operations have resulted in the direct and indirect saving to the taxpayers of millions of Australian dollars.

VICTORIA

Victoria, situated in the south-east section of the Australian continent, is geographically the smallest mainland State (1/34th of Australia). It has an approximate length of 500 miles east to west and an average width of 150 miles. However, it is the most densely populated State with a total population of 3¼ million, 2¼ million resident in the greater metropolitan area of Melbourne, the state capital and residential, commercial and industrial centre located in the centre of its southern coast. The remaining 1 million are located in rural areas and country centres to which a pattern of highways, paralleled by rail and truck telephone lines, radiate from Melbourne. The State has 209 local government areas administered by municipal councils.

Under the state cabinet a State Civil Defence Planning Committee comprised of representatives of relevant government departments and instrumentalities and major voluntary organisations such as Red Cross has been established. A Civil Defence Administrative Section operates in the premier's department. Municipalities are encouraged to form local voluntary civil defence organisations and many have done so. Additionally, police, fire brigades, Red Cross and St. John Ambulance Brigade have incorporated civil defence in their training.

In addition to providing a basis for wartime civil defence, municipal civil defence organisations can provide valuable support to statutory authorities in peacetime disasters within the framework of the state disaster plan which was instituted in 1962. Under this plan the operations of statutory authorities responsible for combatting disasters are supported by other authorities and voluntary organisations which provide auxiliary services such as transport, communications, first aid, emergency feeding, registration and billeting of evacuees, etc. Its broad objective is to ensure that the quickest and most effective support is given in time of disaster, to reduce damage to life and property to a minimum.

Victoria is one of the most bush fire prone areas in the world. Since 1962 the state disaster plan has operated effectively in support of disaster combatting operations generally, and in particular, in support of disaster combatting operations generally, an din particular, in support of firefighting operations.

SOUTH AUSTRALIA

The State of South Australia is situated in the central southern part of the continent and, in total, comprises an area of 380,000 sq. miles. Of this large area approximately 15% only of the southern coastline enjoys a rainfall in excess of 10 inches per annum, and for this reason almost the entire population of some 1,100,000 people reside in this small area.

Also, centralisation of population around the metropolitan capital of Adelaide and its environs is probably greater than in any other state, and in fact, comprises some 60% of the state's population.

Whilst the climate of the state can be described as Mediterranean, the relatively low rainfall and small seasonal variation in temperature extremes account for an almost complete absence of floods, cyclones, or other natural hazards, with the exception of the annual summer bush fire problem, which in years of below average annual rainfall can be quite severe.

These factors have a unique bearing upon civil defence development, and that, if considered from the point of view of wartime threat, the evacuation of the metropolitan area to the less densely populated country areas is a major concern, whereas from the purely natural disaster considerations the threat exists rather to the rural areas and the smaller rural communities of up to, say, 4,000 people.

Accordingly, civil defence is being developed on as wide a basis as possible with the main object of making each separate local government authority, of which there are 140 in the state, an autonomous civil defence unit. The aim being that each unit should develop its own headquarters and the services of warden, welfare, rescue and ambulance and first aid within each organisation.

Naturally, by reason of the vast distances involved in this state, a high degree of mobility must be achieved to ensure that the services can be deployed to the scene of any disaster in a minimum time.

The responsibility for the development of civil defence rests with the local government authority, whether it be a city council, corporation of a country town, or a district council responsible for a rural area. These are grouped into convenient regions for operational control, taking into due account physical and geographical aspects and the availability of communications and transport links.

At June 1968 some 5,000 people in South Australia were voluntarily affiliated with their local civil defence organisations, in many instances by the inclusion of existing organisations such as Red Cross, Emergency Fire Services, and ambulance groups in the overall civil defence plan. These groups partake in combined training exercises and are achieving a very satisfactory level of cooperation and coordination between all voluntary organisations and the permanent emergency services, such as the police force.

A policy of steady development of civil defence is being pursued in the state with the aim that, ultimately, a complete cover will be available by volunteers to supplement the normal professional services to counteract any foreseeable diaster.

WESTERN AUSTRALIA

Western Australia has a coastline of 4,350 miles and an area of 976,000 sq. miles comprising one-third of the continent of Australia, and the population is approximately 1 million out of the Australian total of 12 million people. In addition to primary production in wheat, wool, fruit and timber, important mineral and oil discoveries have accelerated development in north-west areas, bringing new ports and settlements. The United States Navy communications centre at North-West Cape has now been commissioned.

Following a series of bush-fires, cyclones and floods in 1961 the state government set up a Civil Defence and Emergency Service to coordinate planning for both civil defence and the aftermath of natural disasters. This service has been expanded into a protective network of local voluntary emergency services based on country shire areas. For the closer settled city and metropolitan areas, detailed plans are being prepared showing premises and resources available in an emergency and estimating the strength of various services to be raised in time of war.

The Western Australian government has maintained close cooperation with the Commonwealth government in matters appertaining to civil defence. Students are selected and despatched for advanced training at the Australian Civil Defence School at Macedon, Victoria. Also specialised equipment received from Commonwealth sources is held by the state and issued to local organisations. Planning officers have been appointed in state government departments and instrumentalities and also in industry, banking and commerce.

An operational headquarters has been established near Perth which has a base radio installed to maintain contact with mobile sets dispersed over a wide area. The building is set up for both operations and training.

The north-west of the state is subject to cyclone damage and in 1961 cyclonic rains resulted in flooding in the Carnarvon area, necessitating an evacuation of the entire population. The State Civil Defence Service played at vital role in serious bush fires which occurred throughout the south-west portion of the State in recent years. In 1964 flood conditions caused fears that an irrigation reservoir would collapse and this resulted in the evacuation of a town in the south-west until the danger had passed.

The present state of preparedness in civil defence and emergencies in Western Australia compares favourably with the other Australian states.

QUEENSLAND

Queensland is located in the north-eastern area of the Australian continent and comprises 667,000 sq. miles of which over half is north of the Tropic of Capricorn. The State has a population of about 1¾ million of which approximately half are living in the capital city of Brisbane and its close surrounds.

The Civil Defence Organisation was established in Queensland in 1962 and has developed since then in accordance with the policy of the state government which has been directed towards (1) the education of the general public, (2) indoctrination courses, and (3) specific training. Substantial advance has been made in all phases of this policy throughout the state. The planning and development is being undertaken in accordance with advice received from the Commonwealth Government which is based upon the appreciation of the international situation. In organising civil defence, committees have been formed at 42 provincial centres and the committee comprises the mayor or chairman of the local authority, the stipendiary magistrate, resident medical officer, police officer in charge, representatives of the ambulance board, fire brigade, and returned servicemen's league. These committees undertake the planning and organising of civil defence within their localities. Students are sent to the Civil Defence School at Macedon in Victoria and on their return to their home centres they assist the committee in planning and organising civil defence. At the present time at least one citizen has attended the school for specific training from every city or town of any reasonable size. The State has been divided into three areas, Northern, Central, and Southern Queensland. There are 22 local controllers assisting the committees in the education of the general public and in specific training of civil defence procedures.

Planning

The general planning of Civil Defence in Queensland has been completed as far down the chain as localities. Detailed planning is being considered and will eventually meet the requirement of a complete civil defence organisation for the state. Bodies, such as transport, medical, Red Cross, St. John Ambulance, communications, etc., are cooperating in the formation of plans which will enable the use of their services in civil defence in an emergency.

TASMANIA

Tasmania is an island State having an area of 26,400 sq. miles and a population of approximately 400,000, of which about one-third are located in the capital city of Hobart and its suburbs.

In 1962 the Civil Defence Organisation was set up in Tasmania with the object of planning for wartime emergencies. In common with the other states of the Commonwealth the organisation is now closely associated with the statutory authorities responsible for dealing with natural disasters.

The bush fires which engulfed a large portion of the southern area of the state in February 1967 in which some 53 people lost their lives and an estimated thirty million dollars worth of damage done, demonstrated only too clearly and tragically how essential it is to be prepared for sudden disaster.

In the aftermath of this tragedycame an awakening of interest in the Civil Defence and Emergency Services Organisation in both government and public circles. The state government set the lead in having prepred and adopted a state disaster plan which was based on civil defence planning principles. Following recommendation by a committee of experts, the rural fires organisation was completely reorganised, finance was made available to set up and equip a state disaster headquarters, and additional staff were appointed to the Civil Defence Branch of the Premier's and Chief Secretary's Department. The appointment of three area coordinator instructors each responsible for furthering the interests of civil defence in an area consisting of some sixteen municipalities, paved the way for unprecedented expansion and interest in the organisation.

A number of local government authorities, which previously had evinced little interest, have now seen fit to appoint a local controller and sponsor a division of the Civil Defence and Emergency Services for their municipality. This in turn has prompted a great many of the more public-spirited citizens to accept a greater measure of responsibility for planning and organising units of the Services at the local level.

In consequence of the impetus provided by the above activities some four out of every five municipalities in Tasmania are now engaged in promoting civil defence and it can truly be said that the state of preparedness has never been better.

COMMONWEALTH TERRITORIES

The Northern Territory initially formed the northern part of the State of South Australia, but on January 1, 1911 the area was formally transferred to the Commonwealth and became the Northern Territory of Australia. It comprises about a half million square miles and has a population of approximately 36,000, half of which are located in the area of Darwin on the north coast. Nearly all of the Northern Territory is north of the Tropic of Capricorn.

In accordance with the Commonwealth government's policy of accepting responsibility for civil defence in the Australian territories, a civil defence organization was set up in Darwin in 1962 and a controller appointed to the staff of the Administration of the Territory.

The Territory is the nearest part of Australia to Asia and the unsettled political position in some of the near nations has given rise to a feeling of uneasiness in the people of the territory in recent years. This has led to an active interest in civil defence and the preparations and plans for civil defence in the territory are well advanced.

The Australian Capital Territory is an area of 911 sq. miles which was transferred on January 1, 1911 from the State of New South Wales to the Commonwealth for the purpose of establishing a seat of government. The national capital of Canberra has been developed in the territory and many of the central administrations of commonwealth government departments are now located in Canberra. The present population is 112,000.

In 1962 a controller was appointed in the Department of the Interior to organise and plan for civil defence in the A.C.T. This work has proceeded and is now assisting with disaster planning to deal with any natural disasters in the area.

Other Territories. In the other territories under the control of the Department of External Territories civil defence organisations have been established and planning is proceeding.▲

SURVIVABILITY *(Continued from page 10)*

situations involving natural disasters of major proportions. Survivavility is ensured through:

- provision of high quality plant and equipment;
- diversification of routes and circuits;
- metropolitan area juction planning to by-pass metropolitan areas;
- establishment of Thread of Life communications to provide the essential civilian population in a disaster area with a means of communicating with the outside world;
- provision of Line Load Control equipment to ensure continuity of essental telephone service under emergency conditions
- provision of emergency and spare equipment such as auxiliary power supplies and portable microwave towers;
- preventive maintenance and continuous testing of the network;
- fallout protection at points essential to the maintenance and operation of critical services during and after possible nuclear attack;
- establishment of traffic network management centres and plant status centres with authority to direct operations and to implement preplanned restoration procedures;
- establishment of emergency control centres — alternate headquarters — at various point across Canada, and the use of simulated disaster exercises.

Many of these steps have been taken to minimize the effect of a possible nuclear attack on our country. Whatever happens the money will not have been spent in vain because it provides for survivability of the network in cases of other crippling disasters such as flood, fire, storm, or civil disturbance. A major strength lies in the large and well-dispersed organization of skilled people, vehicles, tools and supplies which are available all across the country in various Trans-Canada Telephone System locations. Standardization of the industry's technology and technical practice is such that employees from one part of the country can work in another without retraining.

Exercises to evaluate the effectiveness of the network under simulated disaster conditions are carried out from time to time. For instance, very recently a study was undertaken to determine the ability of the long distance telecommunications network to survive a massive nuclear attack. This study simulated different attack patterns and their effects on the ability of the Canadian network to carry the emergency traffic — official and otherwise —which would surely follow.

The results indicated that the Canadian telecommunications network will provide a high degree of service continuity under any forseeable circumstances. This is due mainly to the unusually large number of direct high-usage traffic groups available throughout Canada, to multiple routes, and to the by-pass and junction-area planning arrangements that have been established around all major centres.

It is to be hoped we never experience the devastation of nuclear attack, but until the basic conflicts among nations are resolved, we all appear destined to live in an uneasy world in which the balance of power may shift at any moment. Under these circumstances, we feel it is important that the communications industry continue to assess its role in Canada in the coutry's defence and survival operations, and that we not fail to provide the continuity of service required in the public interest.▲

STATEMENT ON QUEBEC CIVIL DEFENCE

by

The Hon. Yves Gabias

Minister Responsible for Quebec Civil Defence at St. Adèle

As the Minister responsible for Quebec Civil Defence, it is my pleasure to welcome you on the occasion of the inauguration of the new general office for Zone 8, the Montreal Zone. As you undoubtedly know, this office was until recently located in the City of Montreal itself.

The transfer was carried out in accordance with the regulations of the Emergency Measures Organization, E.M.O., a federal government agency for which the Honourable Léo Cadieux, Minister of National Defence, is responsible.

The Civil Defence agency in Quebec, which corresponds to the federal emergency measures organization, was placed in my charge a few months ago by the provincial government. We co-operate closely and are progressing towards an organization which will be increasingly suited to the duties of the E.M.O. and the Quebec Civil Defence organization.

The emergency headquarters for Zone 8 as well as the headquarters of Zone 4, which are the two Quebec zones most in danger, as one contains the Quebec Capital and the other encompasses the Canadian Metropolis, were not intended to be permanently located in these two cities. For this reason, the Zone 4 headquarters were moved to Ancienne Lorette and those of Zone 8 are now here in Ste. Adele.

The Honourable Léo Cadieux, Minister of National Defence, and Mr. C. R. Patterson, Director General of the Canada Emergency Measures Organization, take advantage of their encounter at Ste-Adèle-en-Bas on September 20 to talk about new projects involving Canada EMO and Quebec Civil Protection.

At the moment, the Ste. Adele office houses the agency's administrative offices as well as the employees required by the Zone 8 emergency measures organization. This includes the organization of an emergency headquarters protected against radioactive fallout and other risks which a modern war would entail. This headquarters, the model of which you can inspect, would serve as a shelter for federal and provincial government specialists among whom are employees of the Civil Defence organization prepared for their emergency roles and capable of informing the government on necessary measures.

Thanks to improved communications methods, this zone emergency government could serve as an intermediary between the provincial government and the zone's municipalities or, by virtue of an emergency decision of the provincial government or the federal government in time of war, could exercise full government powers.

For this reason I am informing you of the construction project, which meets the standards of the Emergency Measures Organization as to housing capacity and the protection it must offer its occupants and which could gain the approval of the Minister of National Defence.

This emergency headquarters will therefore be useful to the federal and provincial governments and to the municipalities in time of war. Headquarters of this type have been built in several other provinces to answer similar needs.

However, I should not like to leave you with the impression that Civil Defence is conceived of only as a function of war. We have complete authorization from the Emergency Measures Organization to undertake in peacetime disasters all the measures which would have been put into effect in the case of war disaster.

Moreover, it must be said that the time for action by the Civil Defence organization is peacetime, for in emergencies it would be the governments, and not Civil Defence, which would take charge with whatever had been carried out in peacetime.

With this idea in mind, and with the provincial government's desire to ensure maximum security for its citizens under all circumstances, Civil Defence is presently devoting all its energies and available funds to municipal services, as it is the municipalities which are affected by disasters and it is there that the first repressive forces are found.

So Civil Defence is helping the municipalities to organize emergency services if they so desire. These services are for the most part made up of volunteers to whom the necessary training is given in accordance with the 13 emergency considerations.

Health — Welfare — Police — Fire

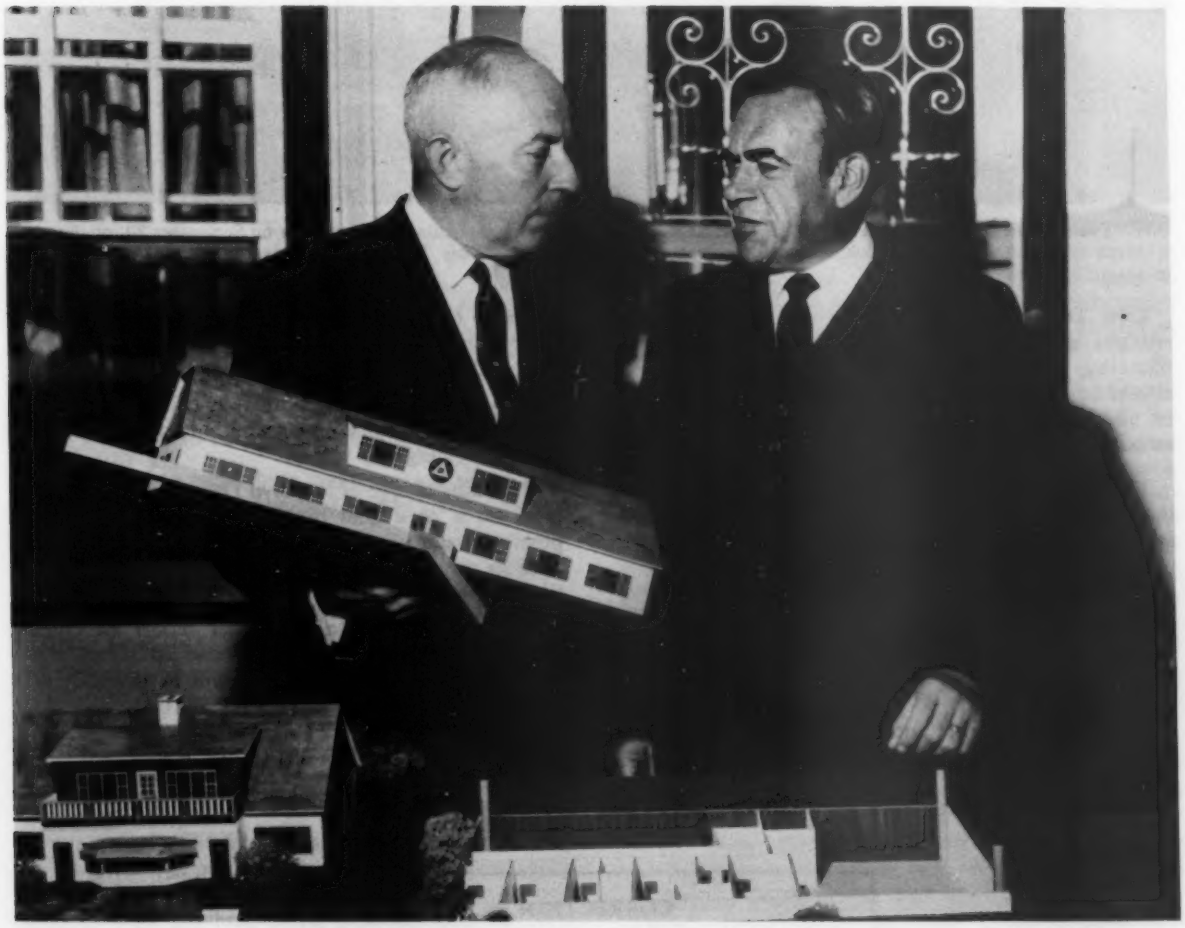
Communication — Transport — Technical

Information — Rescue — Civil Guard

Supplies — Manpower — Radiology

On the subject of the training of municipal auxiliaries, I also wish to inform you of a project for a Civil Defence school for which the government emergency headquarters of Zone 8 would serve as a basis and which you can see superimposed on the emergency headquarters model.

From one end of the Province to the other, Civil Defence has distributed almost 3 million dollars worth of equipment required first of all for its training program and then to meet emergency requirements such as telecommunications, as for example to reinforce the regular communication techniques between municipalities and zone government headquarters.



The Honourable Léo Cadieux, Minister of National Defence, and the Honourable Yves Gabias, Provincial Co-ordinator of Quebec Civil Protection, study the models for the organization's new buildings at Ste-Adèle-en-Bas, Terrebonne County, which were inaugurated on September 20. To date, only the building at the left has been completed; the underground offices and workrooms, and also the training school, will be built as a joint project by the Federal Government and the Province of Quebec. This complex will serve as the seat for an emergency government in the event of nuclear disaster.

Twenty Quebec Civil Protection vehicles serve as a background during inauguration ceremonies on September 20 for the organization's administration offices at Ste-Adèle-en-Bas, Terrebonne County.

Civil Defence contributes the greater part of its energies and advice to the municipalities' emergency planning, for municipality, however weak it may be, always has material and human resources which it will be able to use to begin with and to turn to greater advantage if it has an emergency plan.

The drawing up of this emergency plan will reveal the existing deficiencies and Civil Defence will then help as much as possible to correct them.

Gentlemen, may I take advantage of your presence here to inform the members of the province's municipal councils that the Quebec Civil Defence organization is at their disposal to help in the elaboration of municipal emergency plans.

Our zone directors and group coordinators are available to explain to them exactly what a municipal emergency plan is.

At the moment, in the province of Quebec there are, unfortunately, only approximately 130 municipalities with a basic emergency plan and only one which has a complete emergency plan.

On taking charge of the Civil Defence organization, I have set it as a goal that one day, and as soon as possible, each of the 1652 Quebec municipalities will have its own municipal emergency plan for the protection of the people.

Gentlemen, this is a very brief report on Quebec Civil Defence. However, you will find additional information in the documents which will be distributed to you shortly. ▲

September 20, 1968.

CORRECTION

Vol. 8 No. 5 OCTOBER-NOVEMBER edition of the Digest. Page 2, second paragraph, in the article "Radiological Defence in Canada", the reference to Risk Area Three should have read "750 roentgens in six weeks".

ON REORGANIZING AFTER NUCLEAR ATTACK

(Part Two)

Chapters I and II of this paper by William H. Brown, The Rand Corporation, Santa Monica, California, were published in Vol. 8, No. 4, October-November 1968 edition of the Digest. The following Chapters and References concludes the paper.

Chapter III. Emergency Acting for Postattack Reorganization

In Section I the two prominent points were: (1) that reorganization after nuclear war could be very difficult because of "intangible" vulnerabilities; and (2) with modest budgets for peacetime planning much might be done *during a crisis* to enhance PA reorganization prospects. The first point was illustrated through metaphors and by a stark PA scenario. The second point, which we will discuss in this section, suggests actions that can be taken in a crisis (e.g., stockpiles, training, policies)[3] and offers the possibility of effective countermeasures against the threats of the reorganization period.

A. Stockpiling During Crises

If one visualizes a severe nuclear crisis of weeks or months in duration, during this period stockpiling could become a *necessity*, that is, a natural consequence of traditional prudential thinking. Thus, if federal or local plans did not exist which would facilitate stockpiling, efforts are likely to be *improvised* at the time.

There come to mind three major ways in which such stockpiling could be emphasized during a crisis period. They are:

(1) increasing production,
(2) reducing consumption,
(3) increasing imports (and reducing exports).

Thus, production could be increased by a more intensive use of labor. A substantial increase in this production may be possible by increasing (a) hours of work per shift, (b) number of shifts per day, and (c) days of work per week. This development might also require a substantial shift in labor to the more critical ndustries and an increase in the total labor force.

For example, it may be desirable to greatly increase the production of pesticides and fertilizers. To anticipate this requirement would be important both to the factories that produce these products and to their suppliers. Indeed, it may be important for many chemical plants to be able to shift some of their normal production into these raw materials. Thus, the rubber industry might be able to shift some capacity to producing insecticides.

The second major way by which we may gain resources for emergency stockpiling is through reducing production of consumption items and durables. We would expect that demand for equipment whose value must be amortized over many years would diminish as the crisis became more severe reducing output of standard producers' durables such as automobiles, trucks, railcars, ships, buildings, turbines, or office equipment.

Rationing may be advisable in order to stockpile rapidly and still maintain an equitable distribution. For example, if it were possible to store large quantities of petroleum products then the government might restrict consumption to, say, half-normal during the extreme portions of the crisis. Rationing might also apply to the control of food products if the government policy wished to *discourage* the development of individual hoards.

The third area in which stockpiling can be effective is that of imports and exports. In view of both the threatened vulnerability of stockpiles with the United States, and transport limitations, it might be advisable to try to place orders with foreign countries for goods to be delivered to storage depots within those countries themselves. At the same time exports of critical PA supplies would have to be restricted. This policy could assist the rapid build-up of overseas stockpiles of important materials which later could be shipped and distributed as transportation became available. Of course the potential political repercussions of such a policy would first need to be determined in order to understand its limits.

Although crisis stockpiling seems to be a useful concept, one which would appear even more important during a nuclear threat, the creation of stockpiles for recovery may be relatively less critical than the creation of an organization which can *effectively manage* the stockpiling needs *during and after* the crisis period. This, we believe, is an important point. If accepted it should stimulate more detailed study to understand the potential to create rapidly a great organization which (1) would develop as required by the mobilization needs; (2) would be competent to carry out the preattack measures needed to enhance survival and re-

organization prospects; and (3) would become an entity which, if needed, *could take over the major management functions of the postattack reorganization period.* (See Section C, p. 19.)

B. Emergency Supports for PA Currency

This section suggests that the feasibility of economic recovery may depend upon the existence of new supports for postattack currency. We argue that a major emergency support for (or replacement of) the dollar could occur through a nationalization of all or some substantial part of the food industry.

The previous considerations led us to worry about the danger of not being able to emerge "intact" from the reorganization phase. As we see it the existence of an effective federal government simultaneously implies a functioning civil service which in turn implies a reasonable short-range confidence in the value of a federal currency acceptable to the public. Thus, we argue, the federal government needs personnel, personnel requires usable money, usable money demands that we have (or are confident we soon will have) an effective federal government. The argument thus seems to be a loop which, once broken, may not lend itself readily to reconstruction. It is somewhat analogous to the simpler chicken and egg story; to get one we need the other. If its personnel disappeared, the government and the money system would also vanish. If the government lost its authority, its personnel would leave and the dollar would collapse. If the dollar collapsed, the personnel could not be paid and would have to leave, and the government would then disappear or lose its authority.*

If this argument has merit, it is not at all clear that once collapsed the present federal organization could be reconstructed in anything like months (or even years). This postattack environment could lead to independent, competing, and perhaps feuding regions. Civil war could follow — civil war which could be either intra- or inter-regional. The problems of visualizing a "functioning society" developing out of this environment are so complex and at the moment seem to be so unrewarding that we turn instead to our purpose of examining the preparation needed to prevent the occurrence of such unpleasant possibilities.

It seems that we would need to take appropriate actions to assure the simultaneous continuing viability of the three factors in the government-personnel-money loop. Certainly formal government authority can, in principle, be maintained by simple procedures such as "continuity-of-government" legislation. Second, the desired personnel could probably be maintained or obtained if they are given both preattack and postattack assurances that their services are or will be needed and if they believe that their remuneration will be either in good dollars *or their equivalent.*

Third, in attempting either to bolster confidence in the postattack dollar or to supplant it (temporarily?) with an equivalent exchange medium, the federal government may wish to create (probably during the preattack crisis) a separate authority which would be prepared, if necessary, to take over, import, produce, and/or distribute all items of food. This may amount to creating a capability for the emergency nationalization and operation of the entire food industry. Of course it may not be advisable to implement a full nationalization; at the time partial measures may be deemed sufficient.

If, in fact, the government also succeeded in creating large stockpiles of recovery supplies during the preattack crisis period, it would have real reserves which can be used to back up any new monetary policies which are required to enable the reorganization to occur and the recovery to proceed. Huge stockpiles of food, petroleum products, metals, lumber, paper, medicines, and chemicals would be a far superior underpinning for postattack money than a continuation of present monetary policy.

C. Growth of CD Mobilization Teams

A plausible outcome of a mobilization approach would be the early (peacetime) formation of civil defense teams in commercial and industrial establishments; teams which could develop plans for the best specific survival and recovery options. Presumably, these plans could be implemented later in accordance with international developments and national policy.

As a crisis developed, the growth of these teams and coordination with government groups having area and state responsibilities suggest a potential of millions of "trained" people with special training and education in survival and recovery tasks. Of course, a rapid development of this type would severely test our ability for emergency organization and coordination and in this manner suggests an important area for future studies. Such studies, if undertaken, could have two major purposes: (1) the development of plans for assisting the emergency CD effort and (2) the creation of a temporary "paragovermental" organization to help the government during the reorganization period.

Thus, we have visualized the growth during a nuclear emergency of a loose national organization of trained citizens of millions with which the probability of an effective social and economic reorganization after an urban attack could be greatly enhanced. Also, remarkably enough, it seems not unreasonable to hazard the

*This argument is based on a simplified model of interdependence and examines a *pure case* in order to make the stark point about the loop of interdependence. While any reality situation would be probably very much more complex involving partial losses of personnel, or severe inflations rather than total collapse, nevertheless, our deliberate purpose here for an initial orientation is to consider very extreme cases which may be nearly the same as the pure one. It is clear that in many historical cases, monetary systems have collapsed without the above consequences. However none of them had both the massiveness and the suddenness of a large nuclear attack.

guess that to develop the research and planning which would facilitate this development would involve only a modest peacetime cost.

For the federal government to be able to give reasonable guidance to local recovery preparations during a CD mobilization would require an extensive program based on prior research. If the research is reasonably funded, the formulation of the problem and perhaps the understanding of feasible countermeasures promises to take recognizable shape out of the murk and gloom which presently hovers about these problem areas. The initial research effort should soon be able to suggest the potential of further study; the payoff could be immense.

Although we have conceptualized a set of emergency countermeasures to prevent or greatly reduce the PA threat posed by the reorganization difficulties, we cannot suggest that more than a low-to-moderate confidence can be placed upon their effectiveness. They may be improperly conceived, improperly planned, improperly implemented, or they may prove to be irrelevant to the actual sequence of events. Perhaps a higher confidence will appear with further study or future developments. At any rate the present cost "estimates" for creating the desired mobilization potential seem to be relatively modest and therefore well worth the investment even as a low-confidence system.

Chapter IV. Conclusions

1. Even though a major fraction of the physical resources survive a nuclear attack, the economic viability of the country is not assured. For want of an effective understanding of the needs of the *PA reorganization* period, the country could experience economic "starvation in the midst of plenty."

2. The purpose of preplanning for a CD mobilization is to enable it to proceed rapidly and effectively at the time it is needed. Thus, if the preparations are satisfactory the efforts which would promote the subsequent PA recovery could reasonably be balanced and thereby not only make the recovery more likely but more rapid.

3. The appropriate balancing of crisis activities includes the option to create a large emergency organization which could be indispensable if we wish to assure an effective PA economic reorganization. It is argued that if a CD mobilization does prove effective, that it should tend to produce just such an organization; that is, a "paragovernmental" agency of up to several millions of people who are already partially trained through their preattack emergency functions in the skills needed for managing postattack reorganization problems.

4. Another great threat to an effective reorganization following a nuclear attack is the collapse of federal currency — that is, a nearly complete loss of confidence in the dollar. If this occurred, it could readily be followed by a collapse of the federal civil service and federal authority. It is suggested that preventive actions could include an option to seize the food industry (nationalize it) and, if needed, to operate it during the reorganization period as a temporary federal institution. Some ability to manage this new institution effectively might be provided by the paragovernmental organization mentioned in the preceding paragraph.

5. In addition to seizing the food industry, it is argued that during a crisis period the federal government could begin rapidly building up stockpiles of survival supplies other than food, e.g., petroleum, metals, chemicals, medical supplies. While these goods would undoubtedly have great postattack value, their major utility for the reorganization period would be to provide the federal government with additional "currency" to help assure that the government would survive and function in a way that would meet its major PA responsibilities.

6. In order to provide a solid basis for an industrial role in a mobilization for postattack recovery, local studies are needed in selected industries to uncover their potential for emergency responses within days, weeks, or months. These studies are needed to understand (a) the utility of protective measures to reduce vulnerability, (b) the utility of preattack emergency stockpiling of raw materials and finished products, and (c) the potential of developing talented groups which, through the performance of these emergency functions during a crisis, would provide the large number of experienced personnel needed for a "paragovernmental" organization which would manage the PA reorganization.

7. The complex problems involved in researching and analyzing the requirements for planning a mobilization effort that would greatly enhance a reasonable PA reorganization may require modest federal funding ($ millions, annually) for a decade. It is recommended that this aspect of postattack research should be strongly emphasized in forthcoming years.▲

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(Continued on inside back cover) REFERENCES

Mr. Walter E. Garber, Principal of the Canadian Emergency Measures College, Arnprior, Ontario, has been selected as one of the 1968 recipients of the Charles Pfizer Merit Award for his contribution to the field of civil defence and disaster preparedness.

Selection of Mr. Garber to receive the high honour was made by the Awards Committee of the United States Civil Defense Council who in advising him of the decision stated "your contributions to civil defense and disaster preparedness are outstanding and the Awards Committee desires that you be honoured for this work".

Mr. Garber is the seventh Canadian to be honoured by the award.

Presentation of the Charles Pfizer Award was made at the annual conference in Milwaukee, Wisc., on Thursday, October 31, 1968 by Arthur Burrell, President of the U.S. Civil Defense Council.

The U.S. Civil Defense Council is a national organization composed of civil defense directors from U.S. cities and counties. The Health Services Section is composed of individuals who have contributed to disaster preparedness in the U.S. and has representation from about 20 associations and societies in medical health and disaster fields.

Mr. Garber was born in Bridgewater, N.S., in July 1913. He joined the Canadian Army in 1930 and during the Second World War served as an infantry officer in England, Italy and Northwest Europe. Following the war he held senior appointments in Canada and the United States including command of 1st Battalion, the Canadian Guards, Camp Petawawa, Ontario, and as an instructor at Canadian Army Staff College, Kingston, Ontario.

Following retirement from the Canadian Army in 1963, he was appointed Chief of Studies, and later, in 1965, Principal of the Canadian Emergency Measures College.

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I would like to take this opportunity to join the Director General, officers, and staff of Canada Emergency Measures Organization in wishing readers and contributors a happy and successful New Year.

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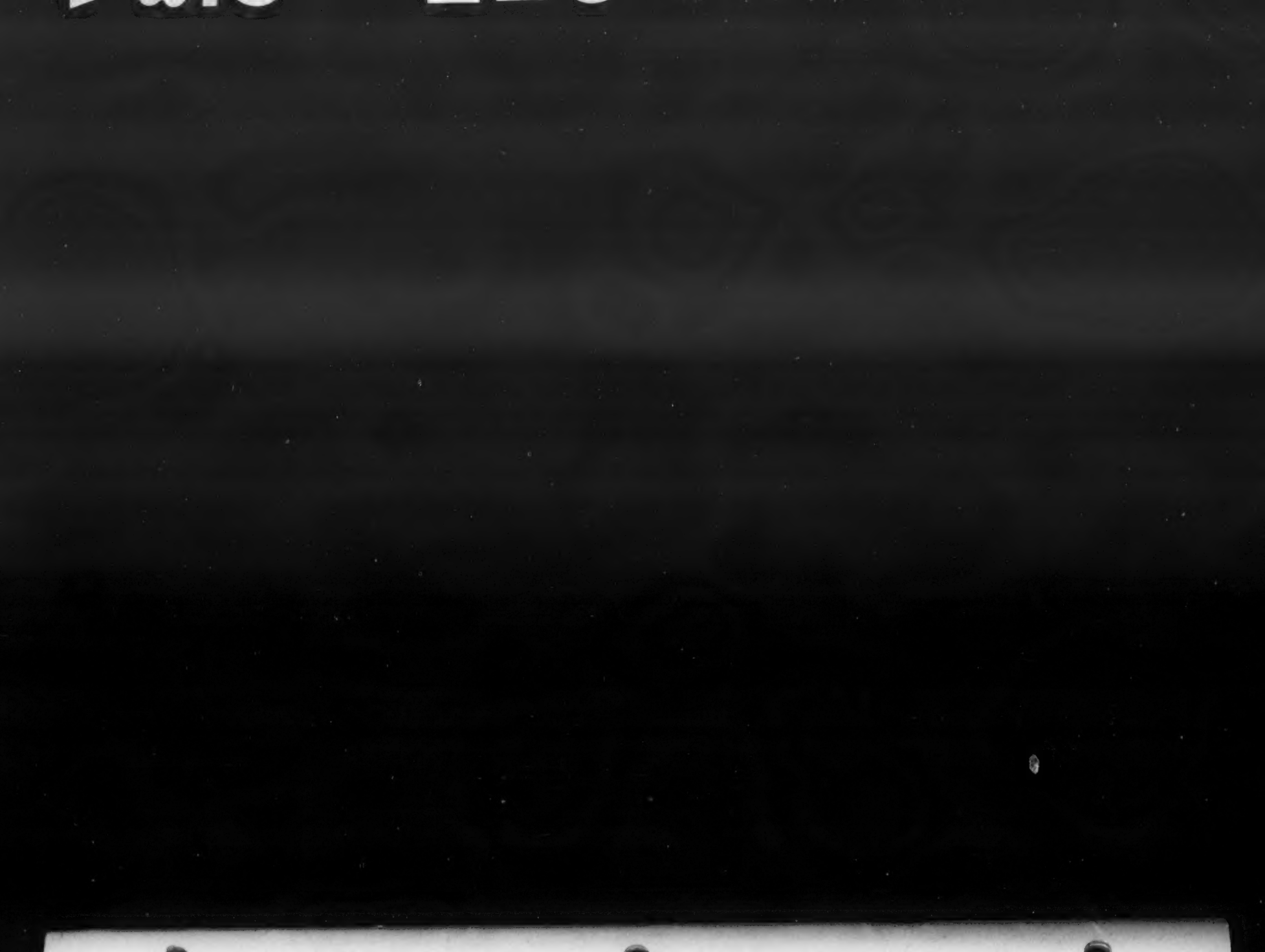
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